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Original Research Article

Study of genital tuberculosis among infertile women at tertiary care centre

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ABSTRACT

Background: A hospital based descriptive clinical study to evaluate the incidence of genital tuberculosis among infertile women and to correlate presentational symptoms and methods of diagnosis.
Methods: A descriptive clinical study, after taking consent a total of 52 patients were enrolled in the study. After evaluation of the couple with the help of history and examination, semen analysis was performed for the male partner. The female partner underwent complete (CBC), erythrocyte sedimentation rate (ESR), chest X-ray, hysterosalpingogram (HSG), endometrial biopsy in pre-menstrual phase. After this basic work-up, if semen analysis showed abnormalities those patients were excluded from the study. Mantoux test is done for every patient.
Results: Total number of patients included was 52. Out of these 15.38% were diagnosed to have genital tuberculosis by the help of a set investigation including PCR which was gold standard and was taken in this study due to its accuracy.
Conclusions: tuberculosis is still a common disease and must be considered in the differential diagnosis of patients with infertility. So, every woman attending an outpatient basis for infertility should be investigated by different investigative modalities to rule out the chance of genital tuberculosis and if present should be treated as early as possible.

Keywords: Anti-tubercular drugs, Fertility, FGTB, Hysteroscopy, TB-PCR

INTRODUCTION

On a global scale, tuberculosis has a devastating impact in developing nations with 13 countries accounting for nearly 75% of all cases.[1] Female genital tuberculosis (FGTB) is a common cause of infertility.[2] Infertility is generally defined as 1 year of unprotected intercourse without conception. Approximately 85-90% of healthy young couples conceive within 1 year. Infertility, therefore, affects approximately 10-15% of couple.[3] Average incidence of infertility due to Female genital tuberculosis is 5-10% worldwide.

The reason for infertility is due to involvement of fallopian tubes (blocked and damaged tubes), endometrium (non-reception and damaged endometrium with Asherman's syndrome) and ovarian damage in tuberculosis.[4-6] Genital tuberculosis appears to be an important and common cause of Asherman's syndrome, causing oligomenorrhea or amenorrhea with infertility. In a study of women with infertility and amenorrhea/ oligomenorrhea, there was history of tuberculosis in 68% of women while the prevalence of genital tuberculosis in tubal factor infertility was 49% in women requesting assisted reproduction.[7,8]

METHODS

Study design

A hospital based descriptive clinical study.

Study place

The study place was conducted at B.P. Koirala Institute of Health Sciences (BPKIHS).

Study duration

The study was done between April 2011–April 2012 over a period of one year on 52 patients.

Ethics committee permission was duly sought from the Institute for study design. After taking consent a total of 52 patients were enrolled in the study. A detailed medical history, including menstrual and obstetrical history, was taken from these women and a systemic, abdominal and vaginal examination was performed.

A complete physical examination where pulse, blood pressure and temperature were noted as well as signs of anaemia, lymphadenopathy or tubercular stigma at any site. Special emphasis was given on the respiratory, cardiac and abdominal regions and a gynaecologic examination included local inspection, speculum examination and bimanual examination for the site, shape and position of the uterus and any adnexal mass and any tenderness or abnormality in the uterus and adnexa.

After evaluation of the couple with the help of history and examination, semen analysis was performed for the male partner. The female partner underwent the following tests, haemoglobin, total leukocyte count (TLC), differential leukocyte count (DLC), erythrocyte sedimentation rate (ESR), chest X-ray, hysterosalpingogram (HSG), endometrial biopsy in pre-menstrual phase.

After this basic work-up, if semen analysis showed abnormalities those patients were excluded from the study.

In blood investigation haemoglobin, total leukocyte counts and differential leukocyte count is done by automated analyser. Erythrocyte sedimentation rate is done by wintrobe's method. Mantoux test is done by standard dose is 5 tuberculin units is injected intradermally (between the layers of dermis) and read 48 to 72 hours later.

A person who has been exposed to the bacteria is expected to mount an immune response in the skin containing the bacterial proteins.

The reaction is read by measuring the diameter of indurations (palpable raised, hardened area across the forearm (perpendicular to the long axis) in millimetres. If there is no induration, the result should be recorded as "O mm". Erythema (redness) should not be measured. Human immunodeficiency virus was tested with ELISA technique.

Apart from routine investigations, specialized investigations consisting of ultrasonography of uterus and adnexa, chest X-ray, immunological tests and hormone profiles including thyroid profile and prolactin and DNA PCR was also done.

A premenstrual endometrial aspirate was obtained for histopathologic examination (HPE) in formalin and sample was sent in normal saline for acid-fast bacilli (AFB) smear. Hysterosalpingography was done to see unilateral or bilateral tubal blockade, beading, pacification or hydrosalpinx. We included PCR in our study to get more accurate detection of genital tuberculosis among infertile women. Patients who come with abnormal semen analysis of their husband were excluded from the current study.

In cases of patients with infertility, mycobacteria were detected by three methods, namely, AFB microscopy, histopathology reports and PCR along with presence of tubal involvement by the help of HSG. In these individuals, no evidence of positive AFB smear compatible with ongoing mycobacterial infection was detected. With acknowledgment that isolation of mycobacteria is the gold standard for diagnosis of tuberculosis, eight isolates were obtained from infertility cases through PCR and ten through histopathology report.

Data analysis

The results of these tests favouring diagnosis of tuberculosis were entered in Microsoft Excel 2007 and converted it into SPSS version 11.5 software for statistical analysis.

For descriptive statistics percentage, proportion, Mean, Median, Standard Deviation and Inter quartile Range were calculated. The significance was examined using Chi square test for categorical data. Data is presented using tabular and graphical methods. The probability of significance was set at 5% level and 95% confidence interval.

RESULTS

The study was done from April 2011-April 2012. Total number of patients included was 52. Out of these 15.38% were diagnosed to have genital tuberculosis by the help of a set investigation including PCR which was gold standard and was taken in this study due to its accuracy. The results are as follows.

Among the age group, 53.85% women were found in between 20-25 years and women above 25 years constituted 46.15%. The mean age of the participants was 26.23±9.6 years. The median age of the women in this study was found to be 25 years.

Most of the women complained of dysmenorrhea constituting 84.61%, while 8 (15.39%) had no such complaints. Sixty nine percent women had regular cycles while 30.77% presented with irregular cycles in total of 52 patients. Only 4 (7.69%) of the women had history of menorrhagia. Women who had complaints of oligomenorrhea were 40.38%.

Most of the women presented with chief complaints of vaginal discharge which was about one third of the total constituting 63.46% Other symptoms like dyspareunia

involved 9 of 52 patients which were 17.30% of the total and rest 19.23% women had no specific complaints. Duration of marriage in majority of women was between 1 to 3 years. Most of the women were staying together for more than a year.

Women presented with primary infertility were 76.92%, whereas 23.08% presented with secondary infertility. Among 52 women 29 had normal menstrual bleeding constituting 55.77%, while 42.31% women had scanty menstruation involving 22 out of 52 and one had heavy menstrual bleeding.

Thirty nine out of 52 women had haemoglobin more than 10 gm/dl with mean of 10.97±2.84. Majority (51.92%) of the women had erythrocyte sedimentation rate less than 25 mm/hour. Among 52 women 10 had abnormal endometrial aspiration constituting, 19.23% of the total which showed granuloma, Langerhans's cells, central caseation, lymphocytes and positive acid-fast stain. Thirty eight percent had positive Mantoux test. None of the women had positive smear for acid fast bacilli.

PCR positive women were 15.38% out of the total number of infertile patients of the present study. Ninety percent of the women had normal ultrasound finding while 9.62% had abnormal findings. Forty six percent had abnormal hysterosalpingography findings (24/52) showing bilateral or unilateral tubal blockage, beaded appearance, hydrosalpinx and no spillage through the tubes.

Out of the total abnormal investigation results, 90% of the positive histopathological report through endometrial aspiration presented with chief complaints of vaginal discharge along with 75% of PCR positive, 67% of abnormal HSG reports, 72% of ESR more than 25 mm, 70% of Mantoux test positive and 60% of abnormal USG had also presented with the same complaints. In comparison, 13% of the abnormal HSG, 12% of the abnormal ESR and at least 5% of the Mantoux test positive patients had complaint of dyspareunia. Rest of the patients that is 10 out of 52 patients had no complaints and constituted rest of the abnormal test percentage.

Women with infertility presented with complaints of irregular and regular menstrual cycles, which was when correlated with abnormal investigation results showed that 100% of the abnormal USG findings were present in women complaining of irregular menstruation while 62.5% of the PCR positive, 58.3% of the abnormal HSG, 55% of positive Mantoux test, 50% of positive histopathology findings and 44% of the total abnormal ESR reports were seen in women with irregular cycles. Rest of the abnormal results had no complaints regarding irregularity of menstruation.

Among all the 52 patients 44 had dysmenorrhea which constituted 87.5% of the total abnormal PCR results, 80% of abnormal USG, 79.2% of abnormal HSG,76% of abnormal ESR, 75% of Mantoux positive test and 70% of the total positive histopathological reports. Rest of the abnormal reports had no complaints in context of dysmenorrhea.

80% percent of the total abnormal USG patients had complaints of oligomenorrhea while rest 20% had no such complaints. Other abnormal investigations when correlated with presence of oligomenorrhea showed that 75% of positive PCR, 70% of positive histopathological findings and positive Mantoux test, 66.7% of abnormal findings in HSG along with 60% of abnormal value of ESR had similar complaints while rest of the abnormal reports had no complaints regarding oligomenorrhea.

Table 1: Socio demographic characteristics of infertility patients attending at BPKIHS gynaecology OPD.

Characteristics	Categories	No. of patient	%
Age group in years	20-25	28	53.85
	>25	24	46.15
Mean age (in years) ±SD		26.23±9.6	
Total		52	100.00

Table 2: Menstrual history of infertility patients attending at BPKIHS gynaecology OPD.

Menstrual history	Categories	No. of patient	%
Cycles	Regular	36	69.23
	Irregular	16	30.77
Dysmenorrhea	Yes	44	84.61
	No	8	15.39
Menorrhagia	Yes	4	7.69
	No	48	92.31
Oligomenorrhea	Yes	21	40.38
	No	31	59.61

Table 3: Obstetrics history of infertility patients attending at BPKIHS gynaecology OPD.

Obstetrics history	Categories	No. of patient	%
Married for (Years)	1-3	26	50.00
	4-10	20	38.46
	>10	6	11.54
Median years (IQR)		3.5 (2-6)	
Duration staying in years	1-3	35	67.30
	4-10	13	25.00
	>10	4	7.69
Median (IQR)		3 (2-4.75)	
Previous pregnancy	Yes	12	23.08
	No	40	76.92

Table 4: Investigation of infertility patients attending at BPKIHS gynaecology OPD.

Investigation	Categories	No. of patient	%
Haemoglobin (g/dl)	<10	13	25.00
	<10	39	75.00
Mean Haemoglobin level (g/dl) ±SD		10.97±2.84	
Erythrocyte sedimentation rate (mm/hr)	<25	27	51.92
	>25	25	48.08
Median ESR (IQR)		22.5 (10-39.5)	
Endometrial aspiration	Abnormal	10	19.23
	Normal	42	80.77
Mantoux test	Positive	20	38.46
	Negative	32	61.54
AFB smear	Positive	00	00.00
	Negative	52	100
PCR	Positive	8	15.38
	Negative	44	84.61

DISCUSSION

In my study out of the 52 patients who presented with infertility for various reasons, eight had genital tuberculosis after investigating, revealing an incidence of 15.4%. In a study, Varma et al, reported the prevalence of genital tuberculosis in infertility clinics varies widely with an incidence of 0.69% in Australia to 19% in India.[9] According to the study done by Oosthuizen et al, since the genital tuberculosis often causes no physical symptoms, asymptomatic infertile women should be investigated for silent or subclinical genital tuberculosis especially in high-risk populations.[10]

In this study all infertile women attending BPKIHS OPD were questioned verbally with a definite set of questions regarding their complaints before examination and investigations. Schaefer et al, classically described female genital tuberculosis as a disease of young women, with 80-90% of patients diagnosed between 20-40 years of age.[4] This justified as, after the puberty the blood supply to the pelvic organs increases" and as a result, more bacilli could reach this site and infect the reproductive organs.[11] Women with genital tuberculosis usually presents with infertility (primary or secondary), chronic lower abdominal or pelvic pain, menstrual dysfunction (oligomenorrhea, amenorrhea and rarely menorrhagia or postmenopausal bleeding), as well as abnormal vaginal discharge and abdominal masses. According to some studies, female genital tuberculosis can present as an abdominal mass with raised levels of cancer antigen 125 and can masquerade as ovarian cancer necessitating unnecessary laparotomy.[12-14] Diagnosis is usually suspected on clinical grounds but must be confirmed by laboratory investigations.

The clinical presentation varies from patient to patient; symptoms like abdominal pain, dyspareunia, dysmenorrhea and vaginal discharge are characteristics indicating a pelvic inflammatory disease. In the present study, oligomenorrhea (40.38%) is the classical symptom which was presented by the women presenting with infertility irrespective of primary or secondary infertility.

Menstrual irregularity in this study was seen in 30.8% women; while in another study done by Singh N et al, revealed menstrual abnormalities only in 13.8% patients, in which abnormalities were in the form of hypomenorrhea and secondary amenorrhea.[4] Another study by Parikh FR et al, was consistent with reports of my study showing 59% of the infertile patients developed oligomenorrhea whereas

only 7% developed menometrorrhagia.[15] Hutchins and Gupta have reported the endometrium to be a common site of tuberculosis involvement.[16,17] Endometrial involvement leads to various menstrual irregularities. According to Tyagi et al, local endometrial changes with systemic effect account for the menstrual abnormalities.[18]

The duration of infertility ranged from 1 to 10 years out of which most of the couples in the study were staying together for around 1 to 3 years. Study done by N Gupta et al, out of the 40 women, 30 (75%) presented with primary infertility while the remaining 10 (25%) had secondary infertility.[19] Which is consistent with my study which showed that out of 52 women, 40 (76.92%) presented with primary infertility while remaining 12 (23.08%) had secondary infertility. In the current study no patient had a history of previous tuberculosis or any contact with tuberculosis patient.

According to Schaefer, patients with pulmonary tuberculosis develop genital infection in 5-13% of cases. The bacilli reach the genital tract by haematogenous or lymphatic spread or by direct extension from an adjacent organ.[4] On the other hand, Punnonen et al, found no previous history or signs on chest radiography, suggesting previous tuberculosis infection supporting in context of the present study.[20] A possible explanation by Schaefer is that the pulmonary lesion may have healed by the time genital tuberculosis manifested itself.[4]

Mantoux tests were positive in 38.5% of the patients with a mean induration size of ≥15 mm ranging from 10-25 mm. Histological diagnosis is confirmatory with a classical picture of granuloma, central caseation, Langhans' giant cells and lymphocytes. Histopathological findings of granulomatous inflammation are more reliable in the diagnosis of genital tuberculosis. Similar studies done by Yousaf and Luqman showed that histological diagnosis is confirmatory with this classical picture.[21,22] In the current study, 19.23% of the women had positive histopathological findings.

Even though the diagnosis of genital tuberculosis is possible by the demonstration of mycobacterium in the genital tract, the characteristic radiographic appearances on hysterosalpingography are reliable indicators of genital tuberculosis as seen in the study done by Chavhan GB.[23] Hysterosalpingogram is frequently used in the initial workup of an infertile female because it is readily available, cost-effective and provides valuable diagnostic information.

According to Crochet et al, tubal findings include occlusion, hydrosalpinx, beading, tobacco pouch or Maltese cross appearance and calcification.[24] In known cases or in circumstances in which genital tuberculosis is highly suspected, hysterosalpingography should be avoided because of the risk of reactivation shown in the study done by Figueroa-Damian et al.[25] In studies by Novak et al and Varma et al, it was seen that; fallopian tubes constitute the initial focus of genital tuberculosis in most of the cases and tuberculosis has accounted for approximately 5% of all cases of salpingitis in many parts of the world.[9,26] The tubes are involved in at least 90% cases and the disease probably starts there.[9]

In the present study out of 52 cases 24 (46.15%) had abnormal findings in which there is tubal calcification (n=1), unilateral tubal block (n=5), bilateral tubal block (n=10) with or without hydrosalpinx, bilateral hydrosalpinx (n=11) and rest 28 (53.85%) were normal.

In another study done by Kulshrestha et al, hysterosalpingography was performed in 169 (86.2%) women out of 244, in which tuberculosis was suspected in 124 (73.4%) women, which was very high in comparison to our current study.[27] Another study done by J B Sharma et al, among 40 women diagnosed to have tuberculosis 11 (27.5%) had abnormal hysterosalpingography finding which was consistent with this study.[25]

Of the six laboratory diagnostic techniques used, AFB staining of endometrial aspirate showed negative results for all cases. In the present study we found only 10 out of 52 (19.2%) patients to be positive by histology. ESR and Mantoux test being abnormal were not very sensitive for the detection of female genital tuberculosis. Hysterosalpingography also showed around 4 6.2% of tubal factor involvement out of which 13.5% had positive PCR value. Almost 16% of the total had both PCR and histopathological report positive.

Firstly, the population that attends our clinic is the tip of the iceberg; ours being a tertiary referral centre for all end stage tubal disease requiring In-Vitro Fertilisation. Secondly, peripheral centres may not have the infrastructure to diagnose genital Koch's nor have access to more sensitive testing, making many cases go undetected.

CONCLUSION

It must be emphasized that tuberculosis is still a common disease in developing countries and must be considered in the differential diagnosis of patients with infertility. Diagnosis based on clinical evaluation is not enough. Patient of high-risk population should be investigated for genital tuberculosis, as these infertile patients often presents with no physical symptoms.

So, every woman attending an outpatient basis for infertility should be investigated by different investigative modalities to rule out the chance of genital tuberculosis and if present should be treated as early as possible.

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REFERENCES

1. Gatongi DK, Gitau G, Kay V, Ngwenya S, Lafong C, Hasan A. The Obstetrician & Gynaecol. 2005;7:75-9.
2. Malkani PK, Rajni CK. Pelvic tuberculosis. Obstet Gynecol. 1959;14:600-11.
3. Speroff Leon, Fritz A Marc. Female infertility. In: Clinical Gynaecologic Endocrinology and Infertility 7th ed. Lippincott Williams & Wilkins. 2005: 1013-1068.
4. Schaefer G. Female genital tuberculosis. Clin Obstet Gynaecol. 1976;19:223-39.
5. Chhabra S. Genital tuberculosis-a baflling disease. J Obstet Gynaecol India. 1990;40:569-73.
6. Sharma JB, Roy KK, Pushpraj M, Gupta N, Jain SK, Malhotra N. Mittal S. Genital tuberculosis; an important cause of Asherman's syndrome in India. Arch Obstet Gynaecol. 2007;2:45-8.
7. Singh N. Sumana G, Mittal S. Genital tuberculosis: a leading cause for infertility in women seeking assisted conception in North India. Arch Gynecol Obstet. 2008;278(4):325-7.
8. Sharma JB, Roy KK, Pushparaj M, Gupta N, Jain SK, Malhotra N, et al. Genital tuberculosis: an important cause of Asherman's Syndrome in India. Arch Gynaecol Obstet. 2008;277:33-41.
9. Varma TR. Genital tuberculosis and subsequent fertility. Int J Gynecol Obstet. 1991;35:1-11.
10. Oosthuizen AP, Wessels PH, Hafer JN. Tuberculosis of the female genital tract in patients attending an infertility clinic. S Afr Med J. 1990;77:56-4.
11. Abebe M. Lakew M. Kidane D, Lakew Z, Kiros K, Harboe M. Female genital tuberculosis in Ethiopia. Int J Gynaecol Obstet. 2004;84:241-6.
12. Barutcu O. Erel HE, Saygili E, Yildirim T. Torun D. Abdominopelvic tuberculosis simulating disseminated ovarian carcinoma with elevated CA-125 level: report of two cases. Abdom Imag. 2002;27:465-70.
13. Sheth SS. Elevated CA 125 in advanced abdominal or pelvic tuberculosis. Int J Gynecol Obstet. 1996;52:161-71.
14. Penna L, Manyonda, Amías A. Intra-abdominal military tuberculosis presenting as disseminated ovarian carcinoma with ascitis and raised CA 125. Br J Obstet Gynaecol. 1993;100:1051-3.
15. Parikh FR, Nadkarni SG, Kamat SA, Naik N. Soonawala SB, Parikh RM. Genital tuberculosis a major pelvic factor causing infertility in Indian women. Fertility and Sterility. 1997;67(3):497-500.
16. Hutchins C. Tuberculosis of the female genital tract-a changing picture: Br J Obstet Gynaecol, 1977;84:534-8.
17. Gupta N. Arora HL, Gupta A. Tuberculosis of the female genital tract. J Obstet Gynaecol India. 1991:41:238-41.
18. Tyagi SP, Ashraf IN, Abassi N, Mohsin N. Endometrial tuberculosis. J Obstet Gynaecol India. 1977;27:935-9.
19. Gupta N. Sharma JB, Mittal S, Singh N. Misra R, Kukreja M. Genital tuberculosis in Indian infertility patients. Int J Gynaecol Obstet. 2007:97(2):135-8.
20. Punnonen R. Kiilholma P. Meurman L. Female genital tuberculosis and consequent infertility. Int J Fertil. 1983;28:235-8.
21. Yousaf A, Zaman G. Sultana N. Frequency of Endometrial tuberculosis in Infertility. J Coll Physicians Surg Pak 2002;12:55-7.
22. Luqman M, Mirza MD, Razzaq 1. A histopathological study of Endometrial Curretage in cases of Infertility in Females, Pak Armed Forces Med J.1997;47:12-4.
23. Chavhan GB, Hira P. Rathod K. Female genital tuberculosis: hysterosalpingographic appearances. Br J Rad. 2004;77:164-9,
24. Crochet JR, Hawkins KC, Holland DP, Copland SD. Diagnosis of pelvic tuberculosis in a patient with tubal infertility. Fertility and Sterility. 2011;95(1):17-20.
25. Sharma JB. Roy KK, Pushparaj M. Kumar S, Malhotra N. Mittal S. Laparoscopic findings in female genital tuberculosis. Arch Gynecol Obstet. 2008;278(4):359-64.
26. Novak ER, Woodruft JD. Novak's Gynecologic and Obstetric Pathology, 8th edn. Philadelphia. WB Saunders. 1979: 328.
27. Kulshrestha V, Kriplani A, Agarwal N, Singh UB, Rana T. Genital tuberculosis among infertile women and fertility outcome after antitubercular therapy. International Journal of and Obstetrics and Gynecol. 2011;113:229-34.

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